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PRELIMINARY NOTES ON THE SALINITY PREFERENCE OF MILKFISH, CHANOS CHANOS, FRY

by

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Abstract

Vertical salinity gradient columns were used to investigate the salinity preference of milkfish fry. Newly captured fry showed a preference for 32 °/oo salinity. Fry which had been in captivity for one to five days, at 12 or 22 °/oo salinity, had no salinity preference between waters of 12, 22 or 32 °/oo salinity.

Introduction

Milkfish, Chanos chanos, fry are traditionally captured at a length of 11-14 mm along the shoreline and transported to brackishwater fish farms where they are grown to marketable size. The fry that are not captured presumably return to sea and are seldom seen again in any manner until they return as spawning adults. Several variations of this pattern occur. Documented reports show some fry enter river-lake systems and spend their first year or two in the lake and return to the sea as sexually immature fish. There are other reports which indicate that some fry stay for a time in mangrove swamps.

As an aid to the milkfish culture, several investigations have been made on the salinity tolerance of milkfish fry and fingerlings (Juliano and Rabanal, 1963; Anon. 1972, 1973a and 1973b) but no salinity preference studies have been made on milkfish fry. In order to understand better the physiology of this species, a study has been initiated to determine the salinity preference of newly captured fry and possible changes in their preference with age. This report contains the initial results of such a study.

Materials and Methods

For this study, milkfish fry were collected daily from the shore waters adjacent to the laboratory at Mag-aba, Pandan, Antique Province, Central Philippines, between May 4 to 10, 1976. Some 100 fry ranging

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in length from 11 to 14.5 mm were selected at random from about 500 fry collected on May 4 and placed in an aerated glass aquarium (30 cm x 15.5 cm x 20 cm) containing diluted sea water at a salinity of 12 °/oo. A second group of 100 was maintained in an identical aquarium but at a salinity of 22 °/oo. These fry were fed with rotifer, Brachionus sp., daily at 0830 hours and 3/4 of the water in each aquarium was changed daily at 0800 hours.

The salinity preference experimental tanks were plastic aquaria (33 cm x 18 cm x 23 cm) placed on a table in a curtained corner of the laboratory. A 1.22 m single fluorescent tube was located 2 m above the tanks.

A 7 cm layer of sea water of salinity 32 °/oo was placed at the bottom of one experimental tank. A 7 cm layer of 22 °/oo diluted sea water was then floated on top of the 32 °/oo water and a 7 cm layer of 12 °/oo was floated on top of the former layer. A layer of 21 cm of water at one salinity was placed in the second tank which served as the control.

Three tests were conducted each day: test I, with fry newly collected from the shore waters (salinity, 32 °/oo); test II, fry "acclimatized" at 22 °/oo; and test III, fry "acclimatized" at 12 °/oo. The control tanks for each test contained water at salinities of 32, 22 and 12 °/oo, respectively. For each test, four fry were placed in each of the gradient and control tanks. Observations on the position of the fry were started one hour later and every 20 minutes thereafter for 80 minutes. Salinities of each water layer were determined after each test, surface temperatures recorded and the fry removed, measured and preserved in 5% sea water formalin.

Results and Discussion

Upon introduction of fry into the experimental or control tanks, it was observed that they immediately swam to the bottom of the tank. On reaching the bottom, they appeared to be very confused. However, they quickly calmed down and it was assumed that the one-hour adjustment period was more than sufficient for recovery from the stress of handling and introduction into new surroundings. In both the control and experimental tanks, occasional schooling was observed in all groups of fry but most of the time the fry swam individually.

Newly captured fry swam freely up and down through the whole column of water in the control tank (32 $^{o}/_{oo}$) but remained in the 32 $^{o}/_{oo}$ layer in the experimental tank. Fry maintained in water with salinities of 12 and 22 $^{o}/_{oo}$ for 1 to 5 days did not exhibit a preference for any particular salinity but swam at random throughout the control and experimental tanks. However, it was observed that these "acclimatized" fry tended to stay longer at the bottom of each tank and appeared to be nibbling or searching for detritus.

The results obtained are still tentative but similar studies on other species (Baggerman, 1960, 1963; Otto and McInerney, 1970; Hain, 1975; Schulz, 1975) have shown that salinity preference is functionally related to the physiological state of individual fish.

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